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Wood Duck Production In The Salt Creek Watershed Of Eastern Nebraska

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Counts of Wood Ducks made during the spring and summer of 1970 on the creeks and reservoirs of the Salt Creek watershed in southeastern Nebraska yielded a conservative estimate of 40 breeding pairs; 16 broods were counted. Estimates of production are biased by numerous variables, including intrinsic sampling problems.

† † †

INTRODUCTION

In eastern Nebraska the Wood Duck *(Aix sponsa)* is an uncommon migrant (Rapp *et al.*, 1958) and breeds in limited numbers in the eastern one-half, and mainly the eastern one-fourth, of the state (Nebraska Game and Parks Comm., 1972). Its abundance in Nebraska apparently mirrors the steady increase of these animals throughout the United States from the near extinction levels of the early 1900's (Bellrose, 1976a). Although the species was listed as a local breeder in almost every one of the United States in 1930 (A.O.U., 1931), Kortwright (1942) did not include Nebraska within its breeding range. It now breeds as far west as Hastings, Nebraska in the south and Springview in the north (Bellrose, 1976b), and its breeding population has been estimated at 4,000 (Sutherland, 1971). Very little has been published, however, to document the distribution of the state's Wood Duck population or the annual natality within this population. During the summer of 1970, I attempted to estimate how frequently Wood Ducks breed and how many young are produced in the Salt Creek watershed of eastern Nebraska (Lancaster County and portions of Butler, Cass, Saline, Saunders, and Seward counties). The number of breeding pairs and young produced on creeks in the watershed was compared with those on reservoirs in the same watershed.

CREEK STUDY AREAS

Sampling units consisted of five-mile lengths of creek, considered reasonable given the time limitations of foot travel. Starting at the Platte River, non-overlapping, five-mile segments were marked off along Salt Creek and its tributaries on a topographic map. No segments were marked off where Salt Creek is channeled through the city of Lincoln, where reservoirs were present on a given stretch of creek, or where a segment was less than five miles long. Creeks passing through concentrations of human population (e.g., Antelope Creek in Lincoln) were also avoided. Forty segments met the criteria for possible study areas and were assigned a number in random order. Of these, ten segments were randomly selected (table of random numbers) for the census. The study areas were numbered 1-10 for reference (for locations see Fig. 1).

Table I:

Results of the Watershed Creek Censuses

Study Area	May		June
	Number of Pairs	Number of Broods	Number of Broods
1	1		1
2			
3			
4	1	1	
5	1		
6			
7			
8	1		1
9	2	1	1*
10	1		1
Totals	7	2	4

*denotes a brood possibly seen on an earlier census.

The creek banks were variously forested. This variable wasn't considered in the selection of study areas in order that the samples be representative of the entire watershed. Generally, where a creek had numerous oxbows, stands of trees from 2-10 acres persisted in spite of agricultural practices. Where the creek bed was straight, cultivation extended nearly to the bank, and only occasionally would a row of scattered trees persist. Species composition varied, but American elm

(Ulmus americana), green ash *(Fraxinus pennsylvanica)*, and cottonwood *(Populus deltoides)* usually predominated. Bur oaks *(Quercus macrocarpa)* were usually found in the drier sites. Understory varied from almost none in heavily grazed woods to impenetrable rank vegetation (for quantitative description see Cink, 1970).

RESERVOIR STUDY AREAS

The reservoirs studied included the ten largest in the watershed (average size–429 acres) and 20 additional impoundments under 100 acres selected randomly from a total of 60 suited to study (impoundments devoid of emergent vegetation and/or with surrounding cover trampled by livestock were considered unsuitable for waterfowl). Figure 1 shows the distribution of reservoirs in the Salt Creek watershed.

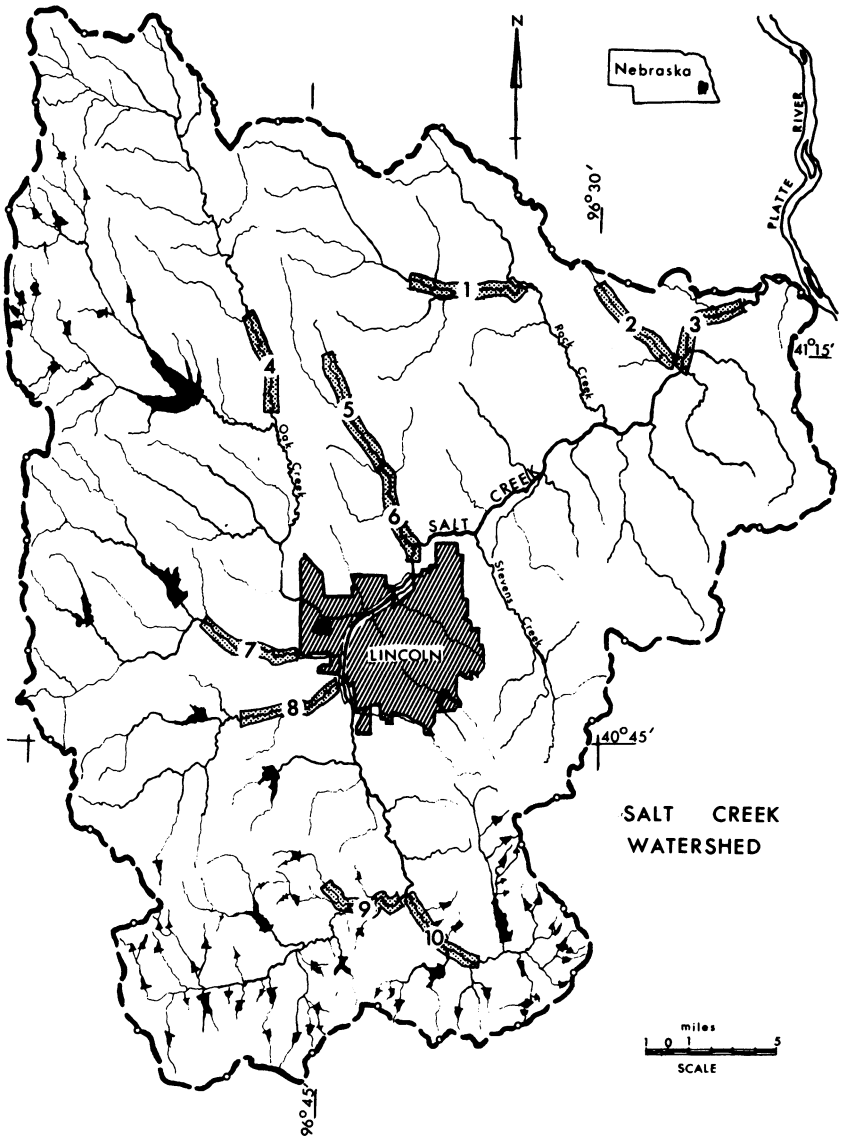

Figure 1. The Salt Creek watershed in southeastern Nebraska (the ten sample study areas stippled).

METHODS

A census of breeding Wood Ducks is difficult because of the wooded habitats preferred. Both flight counts and counts made by floating down inhabited streams have been employed as indices to the abundance of nesting Wood Ducks (Hein, 1966). However, because most of the creeks in the Salt Creek watershed are not navigable, counts of all Wood Ducks seen by walking along the creek banks were used. Brood counts in this type of habitat are especially difficult because the female has ample time to hide the brood when the approach of humans is heard. Although several broods were observed and numbers of young counted, it is likely that some broods were missed. Broods were sometimes discovered from their tracks in the mud along the creek. Broods were aged using the criteria of Dreis (1954). Each creek study area was surveyed in early May for breeding pairs and broods, and in June for broods. Usually, only one study area could be traversed during a morning's work, but on two occasions, adjoining areas were walked on the same day. Searches for breeding pairs and broods were made around the peripheries of the reservoirs during late May, June, and July.

RESULTS AND DISCUSSION

The results of the creek census are shown in Table 1. No breeding pairs or broods were seen in the three study areas that were close to the cities of Lincoln and Ashland. Perhaps these areas had more than the usual amount of human disturbance or simply had less suitable habitat along the creek. The average number of breeding pairs per study area was 0.7. If the average number of breeding pairs on all streams in the watershed could be extrapolated from this figure using the 40 possible study areas, the result would be approximately 28 pairs of Wood Ducks. Considering the low frequency with which this species is encountered in the field, this estimate seems reasonable. All methods used to achieve a census for Wood Ducks seem to underestimate actual population sizes (Stewart, 1958), and, thus, an estimate of 28 pairs may be conservative.

A total of six broods was seen. Based on age and locality, one of these broods was probably the same one seen on a previous count, and, therefore, the correct total is probably five broods. The two broods discovered in May were estimated to be 10 days old, which would place their hatching date about the first week in May or the last week in April. Two of the broods discovered in June were 3-4 weeks old (hatched near the second week in May), and one brood discovered in June was about one week old (hatched in early June). The average brood size was 9.2 (range 5-14). The average number of ducklings produced per study area was 4.6. For the watershed as a whole, this indicates that as many as 184 ducklings could have been produced in 1970. However, nesting habitat along each five-mile segment is not the same, and there is no way of knowing how many of these young were lost to predation. The greatest mortality of young usually comes in the age classes seen (1-2 weeks) according to Grice and Rogers (1965). Although the Wood Duck is sometimes known to raise two broods to flight stage during the same season (Hester, 1965), there was no evidence of this during my study.

Results for the census of Wood Ducks on the largest reservoirs are given in Table 2. Nine pairs were observed for an average of 0.9 pairs per reservoir. It appears that a large reservoir may have more breeding pairs than a five-mile segment of creek. Reservoirs provide larger resting pools and flooded timber that are attractive to Wood Ducks. In addition, nesting boxes have been provided on several of the reservoirs (e.g. Twin Lakes) by the Nebraska Game and Parks Commission. Probably, however, Wood Ducks are just more easily observed on reservoirs than on creeks. Only two pairs were observed on the smaller impoundments. Usually, the smaller reservoirs have less flooded timber and surrounding cover than do the larger reservoirs.

Ten broods were seen on the large reservoirs, but, of these, three recorded broods may have been the same one

Table 2:

Results of the Watershed Reservoir Censuses

Study Areas[1]	May		June	July
	Number of Pairs	Number of Broods	Number of Broods	Number of Broods
Branched Oak	1		1	1*
Pawnee Bluestem	1	1		1*
Wagon Train	1		1	
Twin Lakes	2	1	1	1*
Conestoga	1			
Yankee Hill	1		1	
Stage Coach	1			
Olive Creek	1	1		
Sprague	—	—	—	—
Totals	9	3	4	3

[1] in order of decreasing size.

*denotes a brood possibly seen on an earlier census.

observed earlier in the season. This leaves seven broods, which is still considerably more than might be expected from often disturbed reservoirs. The three broods discovered in May were estimated as 1-2 weeks old (hatch date: April 15-30). Two broods in June were estimated as 3-4 weeks old (hatch date: May 1-7). And the other two broods were estimated as about one week old (hatch date: May 25-31). All three broods found in July were estimated as 5-6 weeks old. The average complement was 7.6 (range 4-10). July broods were all smaller than earlier ones. The actual number of ducklings in some broods may well have been larger than counted, especially where small young were involved, because the broods were usually concealed when the hen was flushed from shore, and it took some work to get the young to flush into the open. Production of young on the ten reservoirs averaged 5.7 per reservoir. No broods were observed on the small impoundments.

These data indicate that the Wood Duck is a low-density breeding bird in the Salt Creek watershed. There may be nearly 28 breeding pairs on the creeks and another 12 pairs on the reservoirs. The sampling technique used in this study would tend to give a conservative estimate of actual numbers. The estimated figures for production of young (184 for creeks and 57 for reservoirs) are undoubtedly biased by such unknown variables as predation, differences in habitat between sample areas and the watershed as a whole, and the intrinsic sampling problems of brood counts in this species. Also, the distinction between creeks and reservoirs is an artificial one: they are in the same drainage system, and Wood Ducks move freely between them. Young hatched along a creek can easily be escorted by their parents to a distant reservoir. Because young Wood Ducks may hatch some distance from water, this type of census will miss some of these individuals. These data are also for one year only, and there may be large differences in production between years.

This study does, however, give some idea of the abundance of breeding Wood Ducks in the Salt Creek watershed and of their productivity in the early 1970's. This could serve as a basis for more intensive study in the future and a baseline for measurement of future population trends.

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REFERENCES

American Ornithologists Union. 1931. Check-list of North American Birds. 4th ed. Lancaster, Pennsylvania, Lancaster Press.

Bellrose, F.C. 1976a. The comeback of the Wood Duck. Wildl. Soc. Bull. 4:107-110.

Bellrose, F.C. 1976b. Ducks, geese and swans of North America. Harrisburg, Pennsylvania, Stackpole.

Cink, C.L. 1970. Breeding bird census No. 3—wooded creek bottom. Audubon Field Notes. 24:739-741.

Dreis, R.E. 1954. A field observation method of aging broods of Wood Ducks. J. Wildl. Manage. 18:280-281.

Grice, D. and J.P. Rogers. 1965. The Wood Duck in Massachusetts. Boston, Mass. Div. Fisheries and Game. 96 pp.

Hein, D. 1966. Float counts vs. flight counts as indices to abundance of nesting Wood Ducks. J. Wildl. Manage. 30:13-16.

Hester, F.E. 1965. Survival, renesting and return of adult Wood Ducks to previously used nest boxes. Proc. Annu. Conf. Southeastern Assoc. Game and Fish Commissioners 16:67-70.

Kortright, F.H. 1942. The ducks, geese and swans of North America. Washington, D.C. Amer. Wildl. Inst. 476 pp.

Nebraska Game and Parks Commission. 1972. The Nebraska fish and wildlife plan. Vol. 1. Nebraska wildlife resource inventory. Mimeo.

Rapp, W.L., Jr., J.L.C. Rapp, H.E. Baumgarten and R.A. Moser. 1958. Revised check-list of Nebraska birds. Occas. Papers Nebr. Ornithol. Union. No. 5. 35 pp.

Stewart, P.A. 1958. Some Wood Duck census methods and their evaluation. Ohio Coop. Wildl. Res. Unit. Columbus. Ohio St. Univ. 13 pp. mimeo.

Sutherland, D.E. 1971. A 1965 waterfowl population model. Bur. Sport Fish and Wildl. Flyway Habitat Manage. 11 pp.